## PEER REVIEW HISTORY



## ARTICLE DETAILS

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| **TITLE (PROVISIONAL)** | Sports Injuries Aligned to Predicted Mature Height in Highly Trained Middle-Eastern Youth Athletes: A Cohort study |
| **AUTHORS** | Rejeb, Abdallah; Johnson, Amanda; Farooq, Abdulaziz; Verrelest, Ruth; Pullinger, Samuel; Vaeyens, Roel; Witvrouw, Erik |

## VERSION 1 - REVIEW

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| **REVIEWER** | Dilip R. Patel MD<br>Western Michigan University Homer Stryker MD School of Medicine United States |
| **REVIEW RETURNED** | 08-Jun-2018 |

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| **GENERAL COMMENTS** | Sport-related musculoskeletal injury risks have been described in various studies over the years for both early maturers as well as late maturers. However, this study specifically looked at a previously less well studied group of athletes; and helps replicate and validate the findings in other populations. |

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| **REVIEWER** | Anu Räisänen<br>University of Calgary, Faculty of Kinesiology, Canada |
| **REVIEW RETURNED** | 03-Jul-2018 |

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| **GENERAL COMMENTS** | The purpose of this study was to investigate the association between maturity status and sports injuries in a cohort of young Middle Eastern male athletes. This is an interesting and relevant topic to address in a cohort that is different from the previous studies on this topic.<br><br>Overall, the manuscript is well written and I enjoyed reading it. However, I do have some specific comments which are listed.<br><br>INTRODUCTION<br>Page 5, line 83<br>For maturity status assessment, two outcome measures (SA and PHV) were used. I would elaborate on the purpose of this study to clearly define what was done.<br>The Introduction does not cover the APHV. In my opinion, the rationale behind using this assessment should be covered. Please consider adding a paragraph.<br><br>METHODS<br>Page 5, line 90 |

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| | Please correct 20010.<br><br>Injury data collection<br>This part is a bit unclear to me. In the first sentence you state: ”All injuries were assessed by a physical therapist (AR) with experience of working within youth sport.” Does this indicate that he read the medical records or did he perform clinical assessment of the injury? What was the purpose of this assessment? In addition, I find it a bit confusing that the injury definition comes later in the Methods section. It would make sense to combine the data collection and injury definition.<br><br>The injury data was collected from medical records. However, you reference the Consensus Statement by Fuller and colleagues from 2006 in which injury definition is not limited to need for medical attention. What was the rational behind limiting the injury definition to medical attention?<br><br>Page 7, line 139<br>Did all the subjects consent to the radiograph? I assume that was the case as there are mentioned of missing data in Table 1. If all the subjects who agreed to participate in the study participated in the radiograph, I don’t think it is necessary to use the term ”consenting athletes” here as you mentioned in the Methods that written consent was obtained. However, if some subjects only participated in the anthropometric measurements and injury collection and declined the radiograph, these numbers should be reported. As it is written now, it indicates only a proportion of the subjects participated in the radiograph.<br><br>Page 7, line 147<br>Here several terms (TL, NTL, overuse, traumatic, injury severity) are defined. However, these are not mentioned later in this manuscript. I assume the survival analysis was performed on using all the recorded injuries. The way the manuscript is written now, these terms do not serve a purpose. I would either add the numbers of TL, NTL, overuse, and traumatic injuries and the distribution of injury severity or consider dropping these definitions.<br><br>Statistical Analysis<br>It seems that exposure data was not collected and instead the survival analysis was performed based on the length of the follow-up. How come the sport participation hours were not collected?<br><br>RESULTS<br><br>The data collection took place over a four-year period. However, only 67 subjects were enrolled. As I applaud the authors for carrying out an extensive data collection period. From the flow chart it is clear that all the subjects did not complete a four-year period. I would like to see numbers on how many athletic seasons were recorded.<br><br>Page 9, line 172<br>Is this 4.9 injuries/per athlete/per year? This is not clear to me.<br><br>In the protocol it is mentioned that the anthropometric measurements were carried out on three monthly bases. Is the APHV in this table calculated from the first measurement? Or the mean of three measurements? |

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| | DISCUSSION<br><br>Page 11, line 226<br>You state that your study size might not have been large enough and I agree. How was the study size arrived at?<br><br>CONCLUSIONS<br>Page 13, line 285<br>Your results indicate that maturity status defined SA (not APHV) is associated with injuries. I would make this clear in the conclusions as the results are conflicting and APHV was not associated with injuries. |

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| **REVIEWER** | Kirsten Spencer<br>Sports Performance Research Institute, New Zealand |
| **REVIEW RETURNED** | 08-Sep-2018 |

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| **GENERAL COMMENTS** | Review Notes:<br>• Abstract is clear and statistics are appropriate.<br>• Introduction – clearly justifies the use of skeletal age.<br>• Exclusion clearly explained<br>• P8 L132- the categories of PMH do not work as they overlap<br>• Method – relevant detail included. Study design contains the key elements; setting and participants explained. Eligibility criteria effective.<br>• Statistical analysis – appropriate. Descriptive data contains most of required detail (see comment re table 1)<br>• Table 1….would like to read the data on Mature athletes included in the table<br>• P11 L197…remove the '%'<br>• Discussion: key results highlighted and explained; limitations addressed; outcomes are clearly generalised to wider application. |

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| **REVIEWER** | Bruno Rodrigues Rosa<br>Universidade Federal do Rio de Janeiro - Rio de Janeiro, Brazil. |
| **REVIEW RETURNED** | 10-Sep-2018 |

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| **GENERAL COMMENTS** | SUMMARY<br>Outcome Measures<br>The sample division criteria must be made clear. It seems that the sample has been divided into two groups and the division criterion was the maturity status (athletes with early maturity status versus athletes with late maturity status). If this was indeed the case, please state this affirmation in a clear and objective way.<br><br>Results<br>The authors present results that have not been clearly described in the Outcome Measures section. The Summary of Results section shows outcomes of four key analyses: 1) athletes with early maturity status versus athletes with late maturity status; 2) predicted bone maturation; 3) risk difference between quartiles; 4) risk difference between different types of sports. Each of these outcomes needs to be described in the previous section.<br><br>METHODS – Page 4 |

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| | Line 107<br>The statement “but injuries present at the beginning of the observation period were not included in statistical analyses”. What is the reason for this? What do the authors understand as “beginning of observation period”? Given that, once this athlete has already signed the consent form and agreed to take part in the study, he is already included in the segment. The removal of this participant from the sample might incur an underestimation of the possible association observed in the study.<br><br>Line 108<br>The authors should clarify the criterion used to define an injury that was sustained from one that was not sustained.<br><br>Line 131<br>Which method was adopted for the prediction of growth? I strongly suggest that the authors refer to: http://austinpublishinggroup.com/pediatric-endocrinology/fulltext/jpe-v1-id1002.php.<br><br>Statistical Analysis<br>Line 163<br>The authors state that “To examine the role of growth status and maturity with the onset of injuries, a univariate Cox regression survival analysis was performed after accounting for repeated visits of some athletes over the four seasons”. Were only athletes who had more visits with injuries taken into account? I suggest this sentence be revised.<br><br>RESULTS<br>Table 1<br>Table 1 shows that the difference between the average skeletal age and the chronological age of the athletes classified as having late maturity is of less than one year. This seems to go against the affirmation made by the authors on line 143, where they state “Late referred to an Skeletal Age that was younger than CA by more than 1.0 y, athletes with a normal pattern of maturity had an SA that was within 1.0 y of CA, early referred to an SA that was older than CA by more than 1.0 y, and the closure of growth plate determine skeletally mature athletes”.<br><br>Line 180 - Skeletal age: maturity status distribution and injury risk<br>It would seem that the athletes with “closed growth” epiphyses have been grouped together with those athletes of normal maturity pattern (variable – skeletal age), resulting in a single (normal) set for the status of maturity of the anthropometric measures. Therefore, how do the authors justify this difference of criterion of classification? This does not seem to make sense, especially given that the analysis of injury-free overall survival was carried out on the two opposing sets (early maturity versus late maturity). In at least one instance, this makes the interpretation of results somewhat confusing (lines 174 – 187). Table 1 shows a classification based on the anthropometric measures, with 3 sets. In the paragraph directly below, a new classification of maturity status is presented ( skeletal age), this time composed of 4 sets.<br><br>Lines 38/197 – 198/ 232 – 233<br>In line 38 the authors say: “PMH was associated with injury risk (HR 1.05, 95% CI 1.01–1.08, P = 0.006)”. However in lines 197 – 198/ 232 – 233, they say: “Both PMH (cm), and %PMH (%) were |

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| | found to be associated with injury risk (HR 1.05, 95% CI 1.01–1.08, P = 0.006, and HR 1.03, 95% CI 1.00–1.06, P = 0.026), respectively". The %PMH was not associated to the risk of injury (1.03, 95% IC 1.00–1.06). The inferior limit of the IC 95% is 1, which represents absence of association (even if it were above one, it would not be a robust/substantial association).<br><br>Lines 207 – 209<br>The affirmations in lines 207 – 209 e 211 – 212 are redundant.<br><br>Lines 214 – 217<br>This explanation should be supported by a reference. The way in which it is presented is vague. Mainly given that previous studies show contrary results.<br><br>Lines 220 – 222<br>This sentence seems to be incorrect. Fourchet et al. classifies the athletes based on Peak Height Velocity, a biological maturity indicator, as well as the skeletal age used in this study.<br><br>Line 276<br>Between the lines 226 – 229 authors justify an inconsistent result with the literature based on a small sample. However, nothing about that is stated in the section that addresses the limitations of study (from the line 276).<br><br>CONCLUSION<br>The conclusion is not correct. Once again the %PMH was not associated to the risk of injury (1.03, 95% IC 1.00–1.06). Lastly there are discrepancies between the Summary of Conclusion and the Final Conclusion.<br><br>CONCLUDING REMARKS<br>The study lacks clarity in certain key points. Moreover, the rigorous application of the STROBE Statement is suggested. The authors should organise the information of the text, adjusting them to the STROBE Statement topics. Ultimately, the statistics used in the study are adequate and not of a complex nature. Nevertheless, there are misinterpretations of the results and this is a potentially sensitive issue in the conclusion of the manuscript. |

**VERSION 1 – AUTHOR RESPONSE**

Reviewer(s)' Comments to Author:

Reviewer: 1

Reviewer Name: Dilip R. Patel MD

Institution and Country: Western Michigan University Homer Stryker MD School of Medicine, United States Please state any competing interests or state 'None declared': None

Please leave your comments for the authors below Sport-related musculoskeletal injury risks have been described in various studies over the years for both early maturers as well as late maturers. However, this study specifically looked at a previously less well studied group of athletes; and helps replicate and validate the findings in other populations.

We highly appreciate the positive feedback from the reviewer

Reviewer: 2

Reviewer Name: Anu Räisänen

Institution and Country: University of Calgary, Faculty of Kinesiology, Canada Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below The purpose of this study was to investigate the association between maturity status and sports injuries in a cohort of young Middle Eastern male athletes. This is an interesting and relevant topic to address in a cohort that is different from the previous studies on this topic.

Overall, the manuscript is well written and I enjoyed reading it. However, I do have some specific comments which are listed.

We appreciate the encouraging and invaluable comments

INTRODUCTION

Page 5, line 83

For maturity status assessment, two outcome measures (SA and PHV) were used. I would elaborate on the purpose of this study to clearly define what was done.

We thank the reviewer for this comment. We have added information regarding SA and PHV in the purpose of the study in the introduction paragraph 2, to make it clear for the reader.

The Introduction does not cover the APHV. In my opinion, the rationale behind using this assessment should be covered. Please consider adding a paragraph.

We have incorporated a sentence regarding APHV to provide more information to the reader.

“A recent study analysis [10] on adolescent soccer players revealed greater risk of injury with players within age at peak height velocity (APHV) in comparison with the players before and after APHV”.

METHODS

Page 5, line 90

Please correct 20010.

We thank the reviewer for this observation; this has been fixed.

Injury data collection

This part is a bit unclear to me. In the first sentence you state:” All injuries were assessed by a physical therapist (AR) with experience of working within youth sport.” Does this indicate that he read the medical records, or did he perform clinical assessment of the injury? What was the purpose of this assessment? In addition, I find it a bit confusing that the injury definition comes later in the Methods section. It would make sense to combine the data collection and injury definition.

To clarify this, we have re-organized the sections as per your suggestion “Injury definition and data collection” and reworded data collection process through the therapist.

The injury data was collected from medical records. However, you reference the Consensus Statement by Fuller and colleagues from 2006 in which injury definition is not limited to need for medical attention. What was the rational behind limiting the injury definition to medical attention?

We would like to thank the reviewer for pointing out this very interesting element: injury definition.

We did not intend to limit our definition to only medical attention, we practically used the “any complaints” definition. The aim is, also to capture insidious injury type, overuse injury. The paragraph was amended accordingly as “any complaints” in the manuscript.

Page 7, line 139

Did all the subjects consent to the radiograph? I assume that was the case as there are mentioned of missing data in Table 1. If all the subjects who agreed to participate in the study participated in the radiograph, I don’t think it is necessary to use the term” consenting athletes” here as you mentioned in the Methods that written consent was obtained. However, if some subjects only participated in the anthropometric measurements and injury collection and declined the radiograph, these numbers should be reported. As it is written now, it indicates only a proportion of the subjects participated in the radiograph.

None of the procedures related to this study were performed without consent. Permissions were taken from the parents and children provided assent. All subjects are consenting of the radiograph as this is considered of a routine check-up/screening at the start of each academic year for all athletes among other screening forms. As the screening can only take place over a set time-period, if athletes do not show up, no records are available for those individuals.

We have taken out the term “consenting” in both the abstract and methodology.

No athletes declined to take part in the radiograph, so we have reported any numbers. We have clarified the sentence for the reader.

Page 7, line 147

Here several terms (TL, NTL, overuse, traumatic, injury severity) are defined. However, these are not mentioned later in this manuscript. I assume the survival analysis was performed on using all the recorded injuries. The way the manuscript is written now, these terms do not serve a purpose. I would either add the numbers of TL, NTL, overuse, and traumatic injuries and the distribution of injury severity or consider dropping these definitions.

We fully agree and understand your comment, but this study forms part of a broader study where the above terms will be investigated under injury characteristics (TL, NTL, overuse, traumatic, injury severity) and discussed in fine details (in a separate manuscript). Therefore, we believe that it is important to display these characteristics in this article as it helps provide important information about how we currently classify injuries within our Sports Academy. This paper will be cited and referred to when we publish the next paper(s).

Statistical Analysis

It seems that exposure data was not collected and instead the survival analysis was performed based on the length of the follow-up. How come the sport participation hours were not collected?

We fully understand the concern of the reviewer, and we agree that it is a potential limitation of the study, and we have now added it to the discussion section. Ideally since children are full time in academy they usually get sufficient and equal exposure daily. We are fully aware that exposure time influences injury incidence rate, but this could be recommended for future study. Currently the duration of exposure is being collected but for my study period this procedure was not in practice.

RESULTS

The data collection took place over a four-year period. However, only 67 subjects were enrolled. As I applaud the authors for carrying out an extensive data collection period. From the flow chart it is clear that all the subjects did not complete a four-year period. I would like to see numbers on how many athletic seasons were recorded.

Thank you for your valuable comments.

We appreciate your question and have provided more information regarding how many athletes were enrolled over how many seasons. This was inserted in the results section.

Page 9, line 172

Is this 4.9 injuries/per athlete/per year? This is not clear to me.

We have clarified the above sentence. “The injury rate observed over the course of 4 seasons was 4.9 injuries per registered athlete”.

In the protocol it is mentioned that the anthropometric measurements were carried out on three monthly bases. Is the APHV in this table calculated from the first measurement? Or the mean of three measurements?

We carried anthropometric measurements as part of a 3-monthly routine screening and calculate the APHV from the initial “pre-season” screening. We have further specified this in our methodology in “Somatic maturation and anthropometric measurements”.

DISCUSSION

Page 11, line 226

You state that your study size might not have been large enough and I agree. How was the study size arrived at?

We thank the reviewer for this question.

The study size used all available students’ athletes within the Academy. We have provided in-depth information in Fig 1 (flow chart) to show the flow of participants in the study over consecutive seasons.

CONCLUSIONS

Page 13, line 285

Your results indicate that maturity status defined SA (not APHV) is associated with injuries. I would make this clear in the conclusions as the results are conflicting and APHV was not associated with injuries.

Thank you for your suggestion.

We have provided more clarity in the conclusion regarding the association of SA and injuries. This has also been changed in the abstract. We have stated that APHV has no association with injuries in this study.

Reviewer: 3

Reviewer Name: Kirsten Spencer

Institution and Country: Sports Performance Research Institute, New Zealand Please state any competing interests or state ‘None declared’: none declared

We very much appreciate positive feedback and invaluable comments

Please leave your comments for the authors below Review Notes:

• Abstract is clear and statistics are appropriate.

• Introduction – clearly justifies the use of skeletal age.

• Exclusion clearly explained

• P8 L132- the categories of PMH do not work as they overlap

Thank you for your comment. We have changed the categories of PMH so they do not overlap to the following:

Q1 < 176 cm; 176 cm ≤ Q2 < 180 cm; 180 cm ≤ Q3 < 184 cm; Q4 ≥ 184 cm.

• Method – relevant detail included. Study design contains the key elements; setting and participants explained. Eligibility criteria effective.

• Statistical analysis – appropriate. Descriptive data contains most of required detail (see comment re table 1)

• Table 1….would like to read the data on Mature athletes included in the table

Table 1 refers to the results from the anthropometric measurements which does not provide information regarding “mature” status criteria.

SA or FELS classifies into four groups (Mature, Early, Normal, Late) but table is according to Maturity status from anthropometric measurements has only 3 groups (Late normal and early)

• P11 L197…remove the ‘%’

Thank you for your valuable comments.

Done

• Discussion: key results highlighted and explained; limitations addressed; outcomes are clearly generalised to wider application.

Thank you for your positive feedback

Reviewer: 4

Reviewer Name: Bruno Rodrigues Rosa

Institution and Country: Universidade Federal do Rio de Janeiro - Rio de Janeiro, Brazil.

Please state any competing interests or state ‘None declared’: None declared.

Please leave your comments for the authors below

SUMMARY Outcome Measures The sample division criteria must be made clear. It seems that the sample has been divided into two groups and the division criterion was the maturity status (athletes with early maturity status versus athletes with late maturity status). If this was indeed the case, please state this affirmation in a clear and objective way.

We would like to thank you for your deep reading and your useful comments, which helped us to strongly improve the clarity of the article, in all its sections. However, it appears that there is some misunderstanding on how we have divided the sample into groups. The sample was divided into three groups as per anthropometric maturity status criteria (See table 1.) and there were two groups of athletes injured and non-injured. And we studied the association between the two. We have now emphasized this clearly in the methods section.

Results

The authors present results that have not been clearly described in the Outcome Measures section. The Summary of Results section shows outcomes of four key analyses: 1) athletes with early maturity status versus athletes with late maturity status; 2) predicted bone maturation; 3) risk difference between quartiles; 4) risk difference between different types of sports. Each of these outcomes needs to be described in the previous section.

Thank you for your valuable comments.

The purpose of the study was to investigate injury according to biological maturity using only two out-come measures (SA and PHV).

From these two outcome measures SA (and its subsequent classification late, normal, early and mature), while from anthropometry measures derived PHV, APHV, predicted mature height (PMH) as an indicator of maturity (and its categorization: Q1-Q4 for analysis purpose) and attained percentage of predicted mature height abbreviated here as %PMH. Classification from anthropometric consisted only in 3 sets maturity level late, normal, and early.

Both outcomes (SA and Anthropometrics) were described with their respective categorization in the methods section. Also, the rationale of categorizing groups of sports was explained in the methods sec-tion, under “participants” sub-heading.

METHODS – Page 4

Line 107

The statement “but injuries present at the beginning of the observation period were not included in statistical analyses”. What is the reason for this? What do the authors understand as “beginning of observation period”? Given that, once this athlete has already signed the consent form and agreed to take part in the study, he is already included in the segment. The removal of this participant from the sample might incur an underestimation of the possible association observed in the study.

We thank the reviewer for pointing out this statement

While we understand the reviewer's concern regarding the validity of the study, we would like to point out that this was done so as to remove the effect of history of injury. Since injured athletes are at more risk of injury on the same location we excluded such participants from that season.

This is usual for any survival analysis type of research where healthy participants are followed up until an event of interest occurs.

Line 108

The authors should clarify the criterion used to define an injury that was sustained from one that was not sustained.

Thank you for your valuable comment.

When highlighting injuries that were not sustained within a sport, we mean that the injury was not related to sport specific activities. E.g. recreational. We have now stated this in the text.

Line 131

Which method was adopted for the prediction of growth? I strongly suggest that the authors refer to:

http://austinpublishinggroup.com/pediatric-endocrinology/fulltext/jpe-v1-id1002.php.

We thank the reviewer for your suggestion and the valuable reference provided, but we are part of an institution (our study setting) where Mirwald et al. 2002 method is adopted for the prediction of growth. We have now clarified this better in the methods section.

Statistical Analysis

Line 163

The authors state that “To examine the role of growth status and maturity with the onset of injuries, a univariate Cox regression survival analysis was performed after accounting for repeated visits of some athletes over the four seasons”. Were only athletes who had more visits with injuries taken into account? I suggest this sentence be revised.

Thank you for your suggestion

Yes, we have taken into account the multiple visits as well as multiple season records for the survival analysis. For example an athlete might be injured twice in a season for whom two records will be present to show the injury free survival time and the event of interest and similarly for subsequent seasons. We have clarified this in the statistical section under methods.

RESULTS

Table 1

Table 1 shows that the difference between the average skeletal age and the chronological age of the athletes classified as having late maturity is of less than one year. This seems to go against the affirmation made by the authors on line 143, where they state “Late referred to an Skeletal Age that was younger than CA by more than 1.0 y, athletes with a normal pattern of maturity had an SA that was within 1.0 y of CA, early referred to an SA that was older than CA by more than 1.0 y, and the closure of growth plate determine skeletally mature athletes”.

Thank you for pointing out this inconsistency. Your remark is true, but we double checked and data are correct

Line 180 - Skeletal age: maturity status distribution and injury risk It would seem that the athletes with “closed growth” epiphyses have been grouped together with those athletes of normal maturity pattern (variable – skeletal age), resulting in a single (normal) set for the status of maturity of the anthropometric measures. Therefore, how do the authors justify this difference of criterion of classification? This does not seem to make sense, especially given that the analysis of injury-free overall survival was carried out on the two opposing sets (early maturity versus late maturity). In at least one instance, this makes the interpretation of results somewhat confusing (lines 174 – 187).

Table 1 shows a classification based on the anthropometric measures, with 3 sets. In the paragraph directly below, a new classification of maturity status is presented (skeletal age), this time composed of 4 sets.

We appreciate your comment.

Using SA with Fels method we can define and classify fully mature athletes (SA/Fels method: late, normal, early and fully mature), which is not the case when using anthropometric measurements (Anthro: late, normal and early). This enables us to provide more in-depth information regarding injury occurrence according to maturity. This is one of the major differences between the two methods (SA/Fels and anthropometric measurements).

Table 1 provides a baseline information about the results emanating from the anthropometrics measures.

Lines 38/197 – 198/ 232 – 233

In line 38 the authors say: “PMH was associated with injury risk (HR 1.05, 95% CI 1.01–1.08, P = 0.006)”. However in lines 197 – 198/ 232 – 233, they say: “Both PMH (cm), and %PMH (%) were found to be associated with injury risk (HR 1.05, 95% CI 1.01–1.08, P = 0.006, and HR 1.03, 95% CI 1.00–1.06, P = 0.026), respectively”. The %PMH was not associated to the risk of injury (1.03, 95% IC 1.00–1.06). The inferior limit of the IC 95% is 1, which represents absence of association (even if it were above one, it would not be a robust/substantial association).

Thank you for your valuable comments and the careful attention

The lower limit of the CI is 1.001 and we have rounded this as 1.00. Statistically speaking if it was 0.9999 and we had rounded it to 1.00, it would have been a non-significant association. I understand this situation so we have placed a p-value which is correct.

Lines 207 – 209

The affirmations in lines 207 – 209 e 211 – 212 are redundant.

Thank you for your comment

In the discussion we provide the main findings of the manuscript in order to discuss them in more detail. The points which are covered here are discussed in more detail throughout the discussion. If we take them out, the discussion will not make any sense.

Lines 214 – 217

This explanation should be supported by a reference. The way in which it is presented is vague. Mainly given that previous studies show contrary results.

We very much appreciate this helpful comment

We have provided a reference for our explanation and incorporated in the manuscript in the discussion section.

Lines 220 – 222

This sentence seems to be incorrect. Fourchet et al. classifies the athletes based on Peak Height Velocity, a biological maturity indicator, as well as the skeletal age used in this study.

Thank you for pointing out this inconsistency

The findings of Fourchet et al. emanated from anthropometric measurements while our results analysed from skeletal age and anthropometric measurements. Their study resulted from using anthropometric measures method while in our study used 2 methods to assess the association between maturity level and injury.

Line 276

Between the lines 226 – 229 authors justify an inconsistent result with the literature based on a small sample. However, nothing about that is stated in the section that addresses the limitations of study (from the line 276).

Thank you for your pointing out this limitation.

We have provided a sentence in the limitation section regarding the sample size of the study.

CONCLUSION

The conclusion is not correct. Once again the %PMH was not associated to the risk of injury (1.03, 95% IC 1.00–1.06). Lastly there are discrepancies between the Summary of Conclusion and the Final Conclusion.

We sincerely thank the reviewer for constructive criticisms and valuable comments, which were of great help in revising the manuscript. Although we understand the concern raised by the reviewer, we disagree because we have re-analyzed the data set and we have found a significant association between %PMH and injury. So, the derived conclusion from the statistical analysis is correct.

CONCLUDING REMARKS

The study lacks clarity in certain key points. Moreover, the rigorous application of the STROBE Statement is suggested. The authors should organise the information of the text, adjusting them to the STROBE Statement topics. Ultimately, the statistics used in the study are adequate and not of a complex nature. Nevertheless, there are misinterpretations of the results and this is a potentially sensitive issue in the conclusion of the manuscript.

We are very grateful for the reviews provided and we strived to clarify main key points in the methods and results sections. We have double checked the statistical analysis and clarified the misunderstanding due to the 95% CI being close to 1.0. The stated statistical results and hence correct and we have made the conclusions only based on the results we have found.

## VERSION 2 – REVIEW

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| **REVIEWER** | Anu Räisänen<br>Faculty of Kinesiology, University of Calgary, Canada |
| **REVIEW RETURNED** | 28-Sep-2018 |

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| **GENERAL COMMENTS** | The authors have addressed the comments raised in peer-review adequately. I have no further comments. |

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| **REVIEWER** | Bruno Rodrigues Rosa<br>Universidade Federal do Rio de Janeiro |
| **REVIEW RETURNED** | 30-Dec-2018 |

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| **GENERAL COMMENTS** | ABSTRACT<br>Background and limitation issues are not included in abstract.<br><br>STROBE Checklist<br>Inconsistences are observed between statement in the text and page/line where it is referred to. |

## VERSION 2 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 2

Reviewer Name: Anu Räisänen

Institution and Country: Faculty of Kinesiology, University of Calgary, Canada

Please state any competing interests or state ‘None declared’: None declared

Please leave your comments for the authors below

The authors have addressed the comments raised in peer-review adequately. I have no further comments.

Thank you

Reviewer: 4

Reviewer Name: Bruno Rodrigues Rosa

Institution and Country: Universidade Federal do Rio de Janeiro

Please state any competing interests or state ‘None declared’: None declared.

Please leave your comments for the authors below

ABSTRACT

Background and limitation issues are not included in abstract.

Dear reviewer

We followed the BMJ open authors and submission guidelines and placed after the abstract a summary, consisting of the heading ‘Strengths and limitations of this study’

STROBE Checklist

Inconsistences are observed between statement in the text and page/line where it is referred to.

Inconsistencies between statement and page were addressed in the STROBE checklist.